

REMARKS

Favorable reconsideration of this application in view of the amendments and remarks to follow is respectfully requested.

Before addressing the specific grounds of rejection raised in the present Office Action, applicants have amended Claim 11 to positively recite that an insulating material is present between the at least two resistor materials. Support for this amendment can be found in FIGS. 1A – 1D. More specifically, referring to FIGS. 1A – 1D, applicants disclose a method of fabricating a thin film resistor comprising forming a first resistor material 12 on a substrate 10; forming a patterned insulating material 14 atop a portion of the first resistor material 12; forming a second resistor material 16 atop the patterned insulating material 14 and the first resistor material 12, the second resistor material 16 having a different temperature coefficient of resistivity than the first resistor material 12, wherein the different temperature coefficients of resistivity provide an effective temperature coefficient of resistivity that is substantially 0 ppm/°C; and patterning at least the first resistor material 12 and the second resistor material 16 to provide a thin film resistor having a selected dimension. Support for this amendment to Claim 11 can also be found in original Claim 12, which has been cancelled herein. Applicants have amended dependent Claim 13 to be consistent with amended Claim 11.

Applicants have also amended Claim 15 to recite that an insulating layer (resistor dielectric) is present within the thin film resistor formed using applicants' method. Referring to FIG. 2F of applicants' disclosure, applicants disclose a thin film resistor 64 including a first resistor material 12 and a second resistor material 16 separated by a resistor dielectric 14.

Claims 11-14 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated by U.S. Patent No. 6,097,276 to Van Den Broek, et al. ("Van Den Broek, et al."). Claims 15 and 17 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent No. 6,603,172 to Segawa, et al. ("Segawa, et al.") in view of Van Den Broek, et al. Claims 16 and 18 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over the combined disclosures of Van Den Broek, et al., Segawa, et al., and U.S. Patent No. 5,643,834 to Harada, et al. ("Harada, et al."). Applicants traverse the aforementioned rejections and submit the following.

Concerning the § 102 rejection, it is axiomatic that anticipation under § 102 requires that the prior art reference disclose *each and every element* of the claim to which it is applied. *In re King*, 801 F.2d, 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1996). Thus, there must be no differences between the subject matter of the claim and the disclosure of the prior art reference. Stated another way, the reference must contain within its four corners adequate direction to practice the invention as claimed. The corollary of the rule is equally applicable: Absence from the applied reference of any claimed element negates anticipation. *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

Applicants respectfully submit that Van Den Broek, et al. do not anticipate the method of forming a thin film resistor recited in amended Claims 11. Van Den Broek, et al. fail to disclose a method of forming a thin film resistor that includes the steps of forming a first resistor material on a substrate; *forming a patterned insulting material atop a portion of the first resistor material*; forming a second resistor material atop the patterned insulting material and the first resistor material, said second resistor material

having a different temperature coefficient of resistivity than the first resistor material, wherein the different temperature coefficients of resistivity provide an effective temperature coefficient of resistivity that is substantially 0 ppm/°C; and patterning at least the first resistor material and the second resistor material to provide a thin film resistor having a selected dimension. Specifically, Van Den Broek, et al. fail to disclose *forming a patterned insulating material atop the first resistor material* and then forming a second resistor material atop the patterned insulating material and the first resistor material.

Van Den Broek, et al. provide precision resistors that comprise a substrate having two connections which are electrically interconnected via a resistance path. The resistance path includes a first portion having a positive TCR and a second portion having a negative TCR. Van Den Broek, et al. do not disclose a method that includes the steps of *forming a patterned insulating material atop a portion of a first resistor material and then forming a second resistor material atop the patterned insulating material*, as recited in amended Claim 11. Referring to Page 2, of the present Office Action, the Examiner alleges, that Van Den Broek, et al. disclose an insulating material separating a first resistor material from a second resistor material. Referring to prior art FIG. 2A, applicants note that the structure depicted includes two resistor elements 26, 25 formed atop an aluminum oxide substrate 22. In accordance with the prior art method disclosed in FIG. 1D and Column 4, Van Den Broek, et al. form the structure in FIG. 2A by providing pathways 5, 6 within the surface of the substrate 22 using lithographic techniques and then depositing the resistor materials 26, 25 within the pathways formed in the surface of the substrate 22. Therefore, Van Den Broek, et al. fail to disclose

forming a *patterned insulating material atop a portion of a first resistor material and then forming a second resistor material atop the patterned insulating material*, as recited in amended Claim 11.

The foregoing remarks clearly demonstrate that the applied references do not teach *each and every* aspect of the claimed invention, as required by *King and Kloster Speedsteel*; therefore the claims of the present application are not anticipated by the disclosure of Van Den Broek, et al. Applicants respectfully submit that the instant § 102 rejection has been obviated and withdrawal thereof is respectfully requested.

Insofar as the § 103 rejections are concerned, applicants submit that the combined disclosures of Segawa, et al., Van Den Broeck, et al. and Harada, et al. do not render applicants' claimed invention obvious, since the applied references do not teach or suggest applicants' claimed method, as recited in amended Claim 15. Specifically, the applied prior art, either alone or in combination, fails to teach or suggest a method comprising the step of forming a first resistor material having a first temperature coefficient of resistivity on a surface of a substrate; forming an insulating material atop the first resistor material; patterning the insulating material to at least provide a capacitor dielectric on a capacitor portion of the first resistor material and a resistor dielectric of a thin film resistor portion of the first resistor material; forming a second resistor material having a second temperature coefficient of resistivity which is different from the first temperature coefficient of resistivity over the first resistor material, the resistor dielectric and the capacitor dielectric, with the proviso that the first temperature coefficient of resistivity and the second temperature coefficient of resistivity provide an effective coefficient of resistivity that is substantially 0 ppm/°C; and patterning the first and second

resistor materials to provide a thin film resistor and a capacitor, said capacitor including at least the capacitor dielectric and said thin film resistor including the resistor dielectric. "To establish a prima facie case of obviousness of a claimed invention all the claimed limitations must be taught or suggested by the prior art". *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 44, 496 (CCPA 1970). The deficiencies of the prior art are now discussed in greater detail.

Segawa, et al. fail to render amended Claim 15 unpatentable, since Segawa, et al. fail to teach or suggest applicants' claimed method. Specifically, Segawa, et al. fail to teach or suggest a method that provides a thin film resistor in conjunction with a capacitor, in which the thin film resistor includes a layered stack of a second resistor material, a resistor dielectric, and a first resistor material, as recited in amended Claim 15. Segawa, et al. disclose a method having a number of embodiments which each utilize a salicide process to provide resistors, inductors, capacitors and MOSFETs, where each device occupies a small surface area without lowering the resistance of the resistor film. Despite disclosing forming a capacitor having a capacitor dielectric, applicants note that in each of the prior art embodiments, Segawa, et al. fail to disclose forming a thin film resistor having a resistor dielectric positioned between a first resistor material and a second resistor material. Therefore, Segawa, et al. fail to teach or suggest patterning an insulating material to provide a resistor dielectric, wherein the resistor dielectric is positioned between a first and second resistor material of a thin film resistor, as recited in amended Claim 15.

Van Den Broeck, et al. also fail to render amended Claim 15 obvious, since Van Den Broeck, et al. also fail to teach or suggest applicants' claimed method. Applicants submit that Van Den Broeck, et al. fail to render amended Claim 15 unpatentable, under

35 U.S.C. §103, for the same reason Van Den Broeck, et al. fail to anticipate Claim 11, under 35 U.S.C §102(b). Therefore, the above comments regarding the deficiencies of Van Den Broeck, et al. to anticipate Claim 11 are incorporated herein by reference. To reiterate, Van Den Broeck, et al. fail to teach or suggest a method for forming a thin film resistor that includes the steps of forming a *patterned insulating material atop a portion of a first resistor material and then forming a second resistor material atop the patterned insulating material* and therefore fail to provide a thin film resistor having a resistor dielectric positioned between a first resistor material and a second resistor material, as provided by the method recited in amended Claim 15.

Harada, et al. do not alleviate the deficiencies in Segawa, et al. and Van Den Broeck, et al. since the applied secondary reference also fails to teach or suggest a method that provides a thin film resistor having a resistor dielectric positioned between a first resistor material and a second resistor material, as provided by the method recited in amended Claim 15. Harada, et al. disclose a process for manufacturing a plastic package type semiconductor device and is far removed from applicants' claimed invention. Applicants observe that Harada, et al. are relied upon for disclosing that NiCr and TiN are good resistive substitutes having similar resistivities so that it would have been obvious to replace the disclosed resistive material of Jones, i.e., NiCr, with TiN. Therefore, Harada, et al. fail to teach or suggest patterning an insulating material to provide a resistor dielectric, wherein the resistor dielectric is positioned between a first and second resistor material of a thin film resistor, as recited in amended Claim 15.

The § 103 rejections also fail because there is no motivation in the applied references, which suggest modifying the disclosed resistors to include the various elements recited in the claims of the present invention. Thus, there is no motivation

provided in the applied references, or otherwise of record, to make the modification mentioned above. "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Vaeck*, 947 F.2d, 488, 493, 20 USPQ 2d. 1438, 1442 (Fed.Cir. 1991).

The rejections under 35 U.S.C. § 103 have been obviated; therefore reconsideration and withdrawal thereof is respectfully requested.

Thus, in view of the foregoing amendments and remarks, it is firmly believed that the present case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,



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